

REMARKS

Applicants respectfully request further examination and reconsideration in view of the above amendments. Claims 1-20 remain pending in the case. Claims 1-11, 14, 15, 17 and 19 are rejected. Claims 12, 13, 16, 18 and 20 are objected to. Claims 17 and 18 are amended herein. No new matter has been added.

ALLOWABLE SUBJECT MATTER

Applicants wish to thank the Examiner for indicating that claims 12, 13, 16, 18 and 20 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

DRAWINGS

Figures 1A and 1B are objected to because they are not designated by a legend indicating that only old art is illustrated. Figures 1A and 1B are amended herein adding the designation --Prior Art--.

CLAIM OBJECTIONS

Claims 17 and 18 are objected under 37 CFR §1.75(a) and (d)(1) as failing to point out and distinctly claim the subject matter that the Applicants regard as the invention. Claims 17 and 18 are amended herein to correct the objection.

35 U.S.C. §103(a)

Claims 1-3, 5-11 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent 6,721,449 by Krishnamachari, hereinafter referred to as the “Krishnamachari” reference, in view of “Image Retrieval with Local and Spatial Queries” by Moghaddam et al., hereinafter referred to as the “Moghaddam” reference. Applicants have reviewed the cited references and respectfully submit that the embodiments of the present invention as recited in Claims 1-3, 5-11 and 19 are not unpatentable over Krishnamachari in view of Moghaddam for the following rationale.

Applicants respectfully direct the Examiner to independent Claim 1 that recites that an embodiment of the present invention is directed to (emphasis added):

A method of measuring color consistency comprising:
obtaining a first two-dimensional image and a second two-dimensional image of an object;
subdividing the first image into a first set of image partitions and the second image into a second set of image partitions, each image partition having a color;
selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object;
assigning each image partition in the first subset and each image partition in the second subset a color value corresponding to the color of the image partition;
placing each image partition in the first subset in one of a first series of histogram subdivisions and each image partition in the second subset in one of a second series of histogram subdivisions based on the color value of each image partition;
comparing the first series of histogram subdivisions to the second series of histogram subdivisions; and

processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity.

Claim 19 provides similar limitations. Claims 2, 3 and 5-11 that depend from independent Claim 1 provide further recitations of the features of the present invention.

Applicants respectfully assert that the combination of Krishnamachari and Moghaddam does not teach, describe or suggest the embodiments of the present invention recited in Claim 1. For instance, Krishnamachari and the present invention are very different. Applicants understand Krishnamachari to teach a method for determining a degree of similarity between a target image and a plurality of reference images. In particular, Krishnamachari teaches a method for graphics based retrieval of images stored in a database.

Applicants respectfully assert that Krishnamachari does not teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. With reference to Figure 1 of Krishnamachari, a user provides a target image 101 to the system. The system then provides a list 171 of images 111 in the database 110 that are most similar to target image 101 (col. 3, lines 28-32). In particular, Krishnamachari does not teach, describe or

suggest that target image 101 and any of the images 111 are of the same object.

Krishnamachari describes examples where the database includes portraits in a museum, works of an artist, or images of automobiles (col. 3, lines 21-26). However, these examples do not teach that the images 111 are the same as the target image 101. For example, portraits of mountains may be similar, but not of the same mountain. Similarly, works of an artist may be an original work or a print of the work. Furthermore, an image of an automobile may be one of however many of that type of automobile was manufactured, which may number in the hundreds of thousands.

In contrast, the present invention provides a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. As described in the specification, two images of the same object are obtained (page 5, lines 7-8; page 11, lines 27-34; page 14, lines 2-4). Specifically, the present invention is useful for testing the color consistency of two sets of pixels of the same object. If the color is consistent, the consistent sets of pixels can be used in three-dimensional modeling of the object. Specifically, images of different objects are not useful for three-dimensional modeling of the same three-dimensional model. By teaching providing a list of images similar to a target image,

Krishnamachari teaches away from using images of the same object, as claimed.

Furthermore, Applicants respectfully assert that Krishnamachari does not teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. With reference to Figure 3 of Krishnamachari, a characteristics comparator 160 is shown. The image characteristics (color consistency) are compared in total, to determine image similarity measures 161. In essence, each partition of each image is compared, and the best overall comparison of the entire image (the greatest number of similarities), is listed as the most similar image (col. 5, line 35 through col. 6, line 29).

In contrast, the present invention provides a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described in the specification, the three-dimensional region of the object is processed depending on the color consistency of the region. Specifically, a similarity occurs where a bin in the first histogram is filled with one or more pixels and at least one of the corresponding bins of the second histogram is also filled (page 14, line 30 through page 15, line 9). In other words, the entire image need not be color

consistent, partitions associated with a region. For example, with reference to Figure 2A of the present invention, the viewpoint of the image influences the color of the image. The images taken by first camera 40 and second camera 50 are different, but histograms of the cameras intersect (page 12, line 32 through page 13, line 7). By teaching that a total similarity measure for an image is determined, Krishnamachari teaches away from processing the region based on whether the histograms have a similarity, as claimed.

Furthermore, Applicants respectfully assert that one skilled in the art would not be motivated to modify Krishnamachari to provide the invention as claimed. As described above, Krishnamachari teaches a method for graphics based retrieval of images stored in a database. In order to provide useful results to a user, each entire image is analyzed so that a similarity measure is provided. This similarity measure is based on the number of occurrences of similar colors in each image, and weighted by the degree of similarity of the colors (col. 6, lines 4-18). In contrast, the present invention is used for determining color consistency of regions of images of the same object for use in three-dimensional modeling. Since the images are not taken from the same viewpoint, the method as taught in Krishnamachari would not be useful in determining color consistency of regions of the images. In essence, Krishnamachari teaches a method for finding similar images, while the invention as claimed provides a method for measuring color consistency of partitions of different images of the same object. As such, Applicants

respectfully submit that Krishnamachari teaches away from such a configuration, and that one skilled in the art would not be motivated to modify Krishnamachari to provide the claimed invention.

Moreover, the combination of Krishnamachari and Moghaddam fails to teach or suggest the claimed embodiments because Moghaddam does not overcome the shortcomings of Krishnamachari. Moghaddam, either alone or in combination with Krishnamachari, does not show or suggest the invention as claimed. Applicants understand Moghaddam to teach a similar image retrieval system as taught in Krishnamachari.

Applicants respectfully assert that Moghaddam does not teach, describe or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” as claimed. Furthermore, Applicants respectfully assert that Moghaddam does not teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described above, an image retrieval system teaches away from the invention as claimed. In essence, Moghaddam teaches image retrieval based on a region-of-interest of an image. However, Moghaddam teaches that the region-of-interest is used to find similar images. By teaching a

system for retrieving similar images based on overall similarity of the region-of-interest, Moghaddam teaches away from the invention as claimed.

Applicants respectfully assert that nowhere does the combination of Krishnamachari and Moghaddam teach, disclose or suggest the present invention as recited in independent Claims 1 and 19, and that Claims 1 and 19 are thus in condition for allowance. Therefore, Applicants respectfully submit that the combination of Krishnamachari and Moghaddam also does not teach or suggest the additional claimed features of the present invention as recited in Claims 2, 3 and 5-11 that are dependent on allowable base Claim 1.

Applicants respectfully submit that Claims 2, 3 and 5-11 overcome the rejection under 35 U.S.C. § 103(a) as these claims are dependent on an allowable base claim.

Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 4,985,856 by Kaufman et al., hereinafter referred to as the "Kaufman" reference. Claim 4 is dependent on independent Claim 1. Applicants have reviewed the cited references and respectfully submit that the embodiments of the present invention as recited in Claim 1 is not unpatentable over Krishnamachari in view of Moghaddam, further in view of Kaufman for the following rationale.

Applicants respectfully assert that neither Krishnamachari, Moghaddam or Kaufman teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” as claimed. Furthermore, Applicants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Kaufman fails to teach or suggest the claimed embodiments because Kaufman does not overcome the shortcomings of Krishnamachari and or Moghaddam. Applicants understand Kaufman to teach a method and apparatus for storing, accessing and processing voxel-based data. Kaufman, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” or “processing the region based on whether the first series of

histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed.

Applicants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Kaufman teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Applicants respectfully submit that the combination of Krishnamachari, Moghaddam and Kaufman also does not teach or suggest the additional claimed features of the present invention as recited in Claim 4 that is dependent on allowable base Claim 1. Applicants respectfully submit that Claim 4 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of “Color Indexing” by Swain et al., hereinafter referred to as the “Swain” reference. Claim 14 is dependent on independent Claim 1. Applicants have reviewed the cited references and respectfully submit that the embodiments of the present invention as recited in Claim 1 is not unpatentable over Krishnamachari in view of Moghaddam, further in view of Swain for the following rationale.

Applicants respectfully assert that neither Krishnamachari, Moghaddam or Swain teach, describe or suggest the embodiments of the present invention

recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” as claimed. Furthermore, Applicants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Swain fails to teach or suggest the claimed embodiments because Swain does not overcome the shortcomings of Krishnamachari and or Moghaddam. Applicants understand Swain to teach the use of color histograms for computer visioning. Swain, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” or “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed.

Applicants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Swain teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Applicants respectfully submit that the combination of Krishnamachari, Moghaddam and Swain also does not teach or suggest the additional claimed features of the present invention as recited in Claim 14 that is dependent on allowable base Claim 1. Applicants respectfully submit that Claim 14 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 6,691,126 by Syeda-Mahmood, hereinafter referred to as the "Syeda-Mahmood" reference. Claim 15 is dependent on independent Claim 1. Applicants have reviewed the cited references and respectfully submit that the embodiments of the present invention as recited in Claim 1 is not unpatentable over Krishnamachari in view of Moghaddam, further in view of Syeda-Mahmood for the following rationale.

Applicants respectfully assert that neither Krishnamachari, Moghaddam or Syeda-Mahmood teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of

measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” as claimed. Furthermore, Applicants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Syeda-Mahmood fails to teach or suggest the claimed embodiments because Syeda-Mahmood does not overcome the shortcomings of Krishnamachari and or Moghaddam. Applicants understand Syeda-Mahmood to teach a method and apparatus for locating multi-region objects in an image. Syeda-Mahmood, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” or “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed.

Applicants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Syeda-Mahmood teach, disclose or suggest

the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Applicants respectfully submit that the combination of Krishnamachari, Moghaddam and Syeda-Mahmood also does not teach or suggest the additional claimed features of the present invention as recited in Claim 15 that is dependent on allowable base Claim 1. Applicants respectfully submit that Claim 15 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

Claim 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 6,711,288 by Kim et al., hereinafter referred to as the "Kim" reference. Claim 17 is dependent on independent Claim 1. Applicants have reviewed the cited references and respectfully submit that the embodiments of the present invention as recited in Claim 1 is not unpatentable over Krishnamachari in view of Moghaddam, further in view of Kim for the following rationale.

Applicants respectfully assert that neither Krishnamachari, Moghaddam or Kim teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. Furthermore, Applicants

respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Kim fails to teach or suggest the claimed embodiments because Kim does not overcome the shortcomings of Krishnamachari and or Moghaddam. Applicants understand Kim to teach a method and for designating a local representative color value for color-based image searching. Kim, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including “obtaining a first two-dimensional image and a second two-dimensional image of an object,” or “processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity,” as claimed.

Applicants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Kim teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Applicants respectfully submit that the

combination of Krishnamachari, Moghaddam and Kim also does not teach or suggest the additional claimed features of the present invention as recited in Claim 17 that is dependent on allowable base Claim 1. Applicants respectfully submit that Claim 17 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

CONCLUSION

In light of the above remarks, Applicants respectfully request reconsideration of the rejected claims. Based on the arguments presented above, Applicants respectfully assert that Claims 1-11, 14, 15, 17 and 19 overcome the rejections of record and, therefore, Applicants respectfully solicit allowance of these Claims.

The Examiner is invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,
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Dated: 2/22/, 2005



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AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Figures 1A and 1B. This sheet replaces the original sheet including Figures 1A and 1B. In Figures 1A and 1B, the designation --Prior Art-- has been added.

Attachment: Replacement Sheet